

CLAIMS

What is claimed is:

1. A method of detecting at least one of a chemical and a species related to the chemical, the method comprising the steps of:
 - providing a surface having at least one of a size and a shape that increases surface enhanced Raman scattering;
 - exposing the surface to a fluid suspected of containing the at least one of a chemical and a related species;
 - exciting the fluid exposed surface with light to cause the fluid exposed surface to produce the surface enhanced Raman scattering; and
 - analyzing data obtained from the surface enhanced Raman scattering to determine the existence of the at least one of a chemical and a related species in the fluid.
2. The method according to claim 1, further comprising the step of treating the surface with at least one additive that enhances the surface enhanced Raman scattering due to the additive's affect on the surface.
3. The method according to claim 1, further comprising the step of treating the surface with at least one additive that acts sacrificially to prevent the surface enhanced Raman scattering produced by the surface from being adversely affected by the at least one of a chemical and a related species.
4. The method according to claim 1, further comprising the step of treating the surface with at least one additive that acts as an intermediate to react with the at least one of a chemical and a related species prior to interaction with the at least one of a chemical and a related species.

5. The method according to claim 1, further comprising the step of treating the surface with an activator that causes the surface to be more surface-enhanced-Raman reactive toward the at least one of a chemical and a related species.
6. The method according to claim 1, further comprising the step of treating the surface with a stabilizer that stabilizes the surface to maintain surface enhanced Raman scattering.
7. The method according to claim 1, further comprising the step of treating the surface with a sacrificial agent to prevent the surface from being dissolved or adversely affected by the presence of the at least one of a chemical and a related species.
8. The method according to claim 1, further comprising the step of releasing the at least one of a chemical and a related species into a gas phase prior to performing the exposing step.
9. The method according to claim 8, further comprising the step of providing a barrier between the gas phase chemical or the related species and the surface.
10. The method according to claim 1, wherein the surface is composed of a metal.
11. The method according to claim 10, wherein the metal is silver.
12. The method according to claim 10, wherein the metal is gold.
13. The method according to claim 1, wherein the surface comprises at least one nanoparticle.
14. The method according to claim 13, wherein the at least one nanoparticle is provided in one of a colloidal form and a solution form.

15. The method according to claim 13, wherein the at least one nanoparticle is provided in a lyophilized colloidal form.
16. The method according to claim 1, wherein the surface has a nanoparticle-like texture.
17. The method according to claim 1, wherein the at least one of a chemical and a related species is cyanide.
18. A kit for detecting at least one of a chemical and a species related to the chemical, the kit comprising:
 - a surface having at least one of a size and a shape that increases surface enhanced Raman scattering; and
 - at least one additive for performing at least one of enhancing the surface enhanced Raman scattering due to the additive's affect on the surface, acting sacrificially to prevent the surface enhanced Raman scattering produced by the surface from being adversely affected by the at least one of a chemical and a related species, and acting as an intermediate to react with the at least one of a chemical and a related species prior to interaction with the at least one of a chemical and a related species.
19. The kit according to claim 18, wherein the at least one additive includes an activator that causes the surface to be more surface-enhanced-Raman reactive toward the at least one of a chemical and a related species.
20. The kit according to claim 18, wherein the at least one additive includes a stabilizer that stabilizes the surface to maintain surface enhanced Raman scattering.
21. The kit according to claim 18, wherein the at least one additive includes a sacrificial agent to prevent the surface from being dissolved or adversely affected by the presence of the at least one of a chemical and a related species.

22. The kit according to claim 18, wherein the at least one additive includes a material for releasing the at least one of a chemical and a related species into a gas phase.
23. The kit according to claim 18, further comprising a barrier that prevents a liquid form of the at least one of a chemical and a related species from contacting the surface but allows a gaseous form of the at least one of a chemical and a related species to pass therethrough and contact the surface.
24. The kit according to claim 18, wherein the surface is composed of a metal.
25. The kit according to claim 24, wherein the metal is silver.
26. The kit according to claim 24, wherein the metal is gold.
27. The kit according to claim 18, wherein the surface comprises at least one nanoparticle.
28. The kit according to claim 27, wherein the at least one nanoparticle is provided in one of a colloidal form and a solution form.
29. The kit according to claim 27, wherein the at least one nanoparticle is provided in a lyophilized colloidal form.
30. The kit according to claim 18, wherein the surface has a nanoparticle-like texture.
31. The kit according to claim 18, wherein the at least one of a chemical and a related species is cyanide.
32. The kit according to claim 18, further comprising a container for storing the surface and the at least one additive.

33. The kit according to claim 18, further comprising a container for storing the surface and the at least one additive, and mixing the at least one additive with the surface and a sample to be tested for the existence of the at least one of a chemical and a related species.